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THE DIVISION'S GEOPHYSICAL PROGRAM

. . . by Rodger H. Chapman

As one phase of its augmented program of research in geology and mining, the Division of Mines and Geology has recently inaugurated a geophysical program. The addition of Dr. Chapman, geophysicist, to the staff of the Division to head the new program was announced in the October 1961 issue of this magazine. – Edit.

The geophysical program of the Division of Mines and Geology, now well under way, has three major objectives: 1) to provide geophysical support for the various geologic projects of the Division; 2) to investigate the application of geophysical methods in the search for particular mineral commodities; and 3) to encourage geophysical exploration by the state's mineral industries.

The program includes field projects, both regional and local, as well as basic laboratory studies.

Regional Geophysical Studies

Currently underway are compilation projects that will yield gravity and ground magnetic contour maps covering the state. The maps will use both the 1:1,000,000 scale, mainly useful for broad interpretations, and the 1:250,000 scale – the scale of the new Geologic Map of California.

Both the gravity and magnetic mapping projects are principally concerned with the collection of data from outside sources. The gravity program, for example, will be one in which the Division will be working closely with the U.S. Geological Survey, universities, and private organizations. In places where coverage is inadequate, the Division will make field surveys to fill the gaps. At present, several such field studies are underway. Although their primary purpose is to lend geophysical support to geologic mapping projects, they will also provide data for regional compilations. Currently, surveys are underway near Clear Lake, Lake County, and Bridgeport Valley, Mono County, to determine gravity values.

A project that must run concurrently with the compilation of the gravity base map is that of establishing a network of gravity base stations throughout the state. It will be developed using a few stations that have been tied accurately to the national gravity base in Washington, D.C. A high range, carefully calibrated gravity meter will be used, in an effort to keep all of the observed gravity determinations within a range of error of about 0.10 milligal. The network will include reoccupied pendulum stations of the U.S. Coast and Geodetic Survey, as well as other base stations. The network, when complete, should provide reference points for future work, and a means to tie together the various local surveys. In addition, the relatively precise gravity determinations made for the network should be of value in future studies of the changes of gravity with time.

The value of airborne magnetometer surveys for both mining and petroleum exploration is well known. In California, both of these major units of the mineral industry have conducted aeromagnetic surveys, as has the U.S. Geological Survey. Some of the surveys have led to the discovery of mineral deposits, particularly iron, but details of many have not been released.

In other states and in Canada, aeromagnetic maps of large areas are available, and have proved to be a stimulus to prospecting. The surveys have provided valuable geologic information, and many have led directly to spectacular mineral discoveries.